CLAIMS

What is claimed is:

1   1.   A method to express a topological structure of an object in an image,

2   comprising:

3   tracing a topology of the object, the topology comprising a structure including

4   a plurality of binary branches; and

5   simultaneously generating extensible markup language (XML) elements to

6   generate an XML document having a nesting structure describing the topology

7   structure of the object.

1   2.   The method of claim 1 where the tracing of the topology further comprises:

2   generating a bitmap skeleton of the object;

3   generating an empty XML file;

4   tracing the bitmap skeleton from a suitable end point on the skeleton;

5   recursively selecting adjacent pixels of the bitmap skeleton; and

6   adding line and grouping elements to the XML file when either 0 or 2

7   neighboring pixels are encountered.

1   3.   The method of claim 2 where the adding of line and grouping elements to the

2   XML file further comprises:

3   adding a line element as a child of a grouping element;

4   adding a transform attribute to the grouping element with rotation and

5   translation properties, wherein the translation value is the length of the parent line

6   and the rotation values is the angle the parent line would be rotated to align with the

7   child line;

8   adding an attribute to the line element with a value equal to the length of the

9 child line.

1 4.   The method of claim 1, wherein the XML file that is generated is used to store

2 attributes representing physical properties of the topology structure without requiring

3 a location referencing system.

1 5.   A computer-readable medium having instructions stored thereon, which when

2 executed express a topological structure of an object in an image by performing

3 operations, including:

4   tracing a topology of the object, the topology comprising a structure including

5 a plurality of binary branches; and

6   simultaneously generating extensible markup language (XML) elements to

7 generate an XML document having a nesting structure describing the topology

8 structure of the object.

1 6.   The computer-readable medium of claim 5, wherein execution of the

2 instructions traces the topology of the object by performing the further operations of:

3   generating a bitmap skeleton of the object;

4   generating an empty XML file;

5   tracing the bitmap skeleton from a suitable end point on the skeleton;

6   recursively selecting adjacent pixels of the bitmap skeleton; and

7   adding line and grouping elements to the XML file when either 0 or 2

8 neighboring pixels are encountered.

1 7.   The computer-readable medium of claim 5, wherein execution of the

2 instructions performs the adding of line and grouping elements to the XML file by

3 performing the further operations of:

4   adding a line element as a child of a grouping element;

5   adding a transform attribute to the grouping element with rotation and

6 translation properties, wherein the translation value is the length of the parent line

7 and the rotation values is the angle the parent line would be rotated to align with the

8 child line;

9   adding an attribute to the line element with a value equal to the length of the

10 child line.

1 8.   The computer-readable medium of claim 5, wherein the XML file that is

2 generated is used to store attributes representing physical properties of the topology

3 structure without requiring a location referencing system.